Weapon System Technical Architecture Working Group

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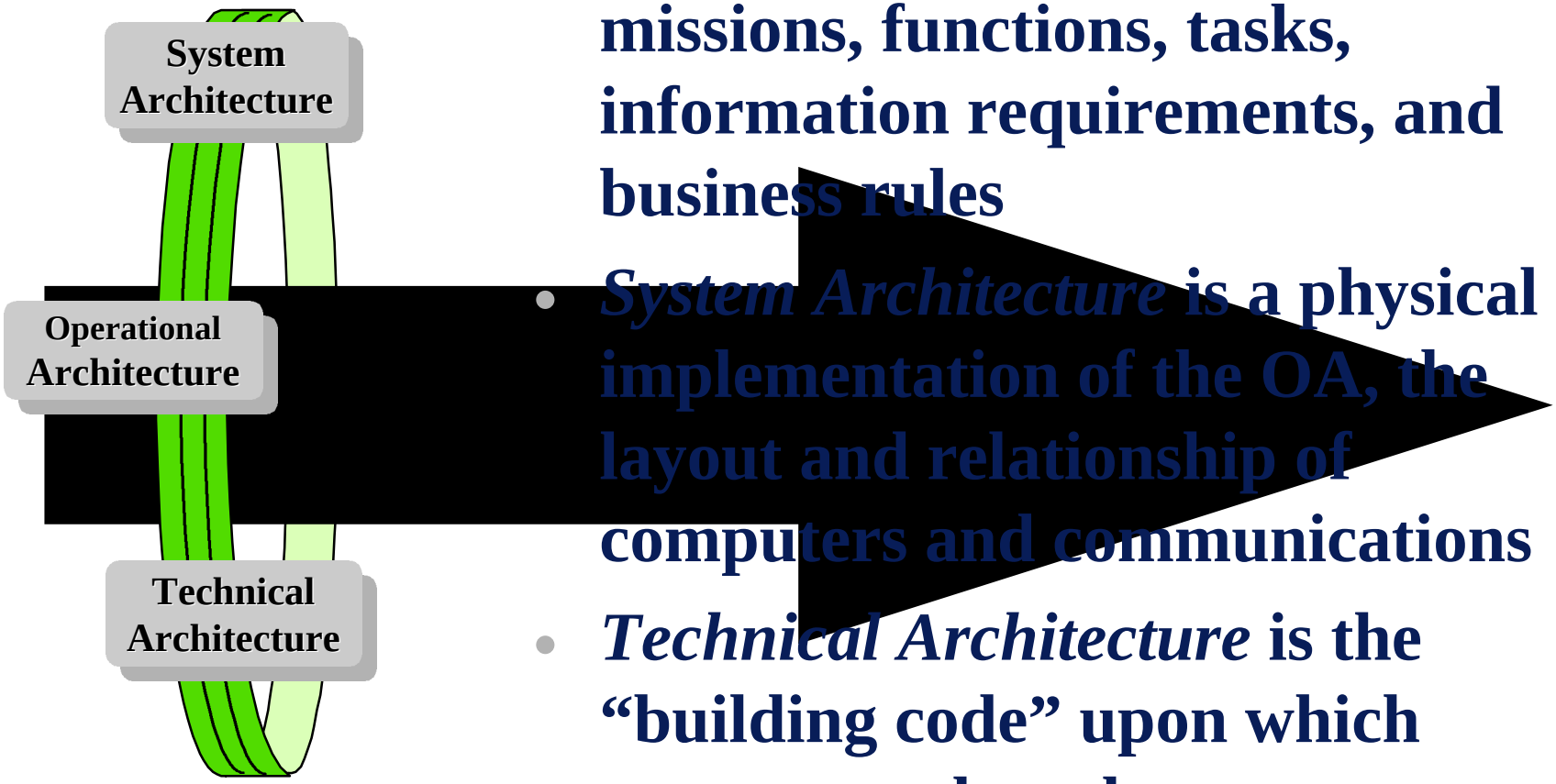
Agenda

- Background
- Weapon Systems Technical Architecture Working Group
  - Organization and Principals.
  - Scope and Activities.
  - Process
  - Sub Domain Update
- WSTAWG Comments on ATA.
  - Common Operating Environment
  - Contracting
- Summary
- Path Forward

The Three Architecture



- ***Operational Architecture*** **is missions, functions, tasks, information requirements, and business rules**
- ***System Architecture*** **is a physical implementation of the OA, the layout and relationship of computers and communications**
- ***Technical Architecture*** **is the "building code" upon which systems are based**

Scope Of The Army Technical Architecture

- **The ATA applies to all systems that produce, use, or exchange information electronically. The target audience is anyone involved in the development of new or improved systems.**
- Within the Army, the Vice Chief of Staff, Army and the Army Acquisition Executive have jointly made each Milestone Decision Authority (MDA), Program Executive Officer (PEO), and Program/Product Manager (PM), Advanced Technology Demonstration (ATD) Manager, and Advanced Concept and Technology Demonstration (ACTD) Manager responsible for incorporating the specification of the ATA into their respective programs and products.
- Materiel developers will use the ATA to ensure that products meet interoperability performance and sustainment criteria.
- Combat developers will use the ATA in developing requirements and functional descriptions.
- Battle Labs will use the ATA to ensure that the fielding of their "good ideas" are not unduly delayed by the cost and time required for wholesale reengineering to meet specifications.

Army Technical Architecture Objectives

OBJECTIVE	MECHANISM
• **Interoperability**	**Minimal Set of Mandated *Standards***
• Reduce Cost, Speed Fielding	SW Reuse - Common Operating Environment & Individual Standards
• Influence Technology R&D	Publish ATA

Organization of the WSTAWG

Weapon Systems Domain

Chairperson: Mr. Christopher Ostrowski
TARDEC

Missile Sub-Domain
Lead: Mr. R. Summers
MRDEC

Ground Vehicle Sub-Domain
Lead: Mr. S. Grevemeyer
TARDEC

Soldier Sub-Domain
Lead: Mr. J. Monroe
NATICK

Aviation Sub-Domain
Lead: Mr. C. Mudd
AVRDEC

Army Materiel Command
Mr. E. Nidhiry

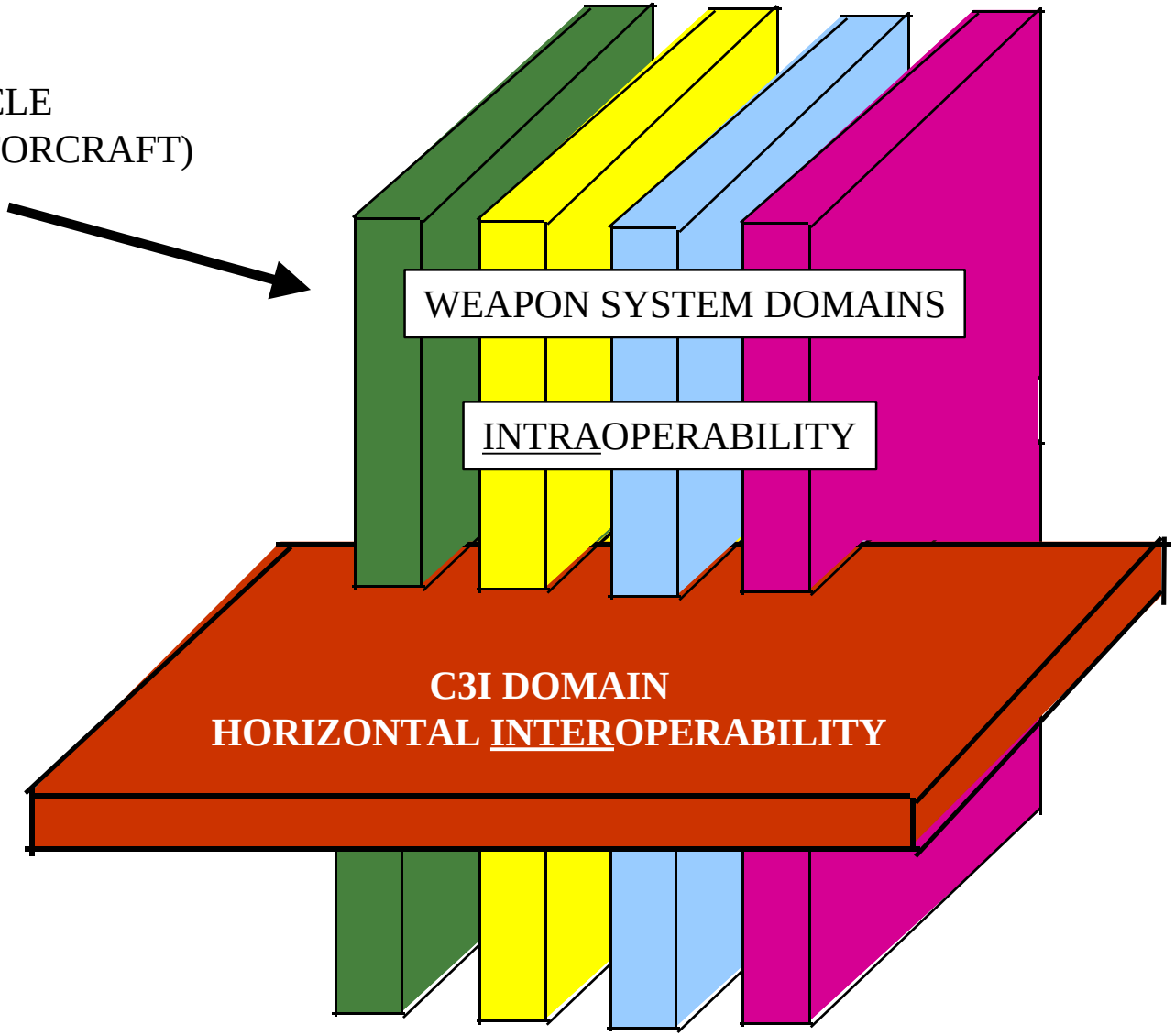
Army System Engineering Office
Mr. R. Delcoure

DISC4
Ms. A. McCullough-Graham

ARMY WEAPON SYSTEM DOMAINS

DOMAINS:

- GROUND VEHICLE
- AVIATION (ROTORCRAFT)
- MISSILES
- SOLDIER



SCOPE of the WSTAWG

- The WSTAWG mission is to expand the Army's C4I Technical Architecture (TA) to accommodate the unique real-time, embedded requirements of Army weapon systems.
- This TA expansion must provide value-added to weapon systems, consistent with DOD policies for open system approaches to acquisition, and adaptable to future technologies.
- The TA expansion will either be implemented as part of the existing Army C4I TA document or as a separate weapon systems technical architecture document with references or interfaces to its C4I counterpart.
- This TA expansion will be done in close liaison with the OSD OS-JTF and Industry.

- Phase I Report to ADO/DISC4
Mr. Donald Sarna, 26 May 95.

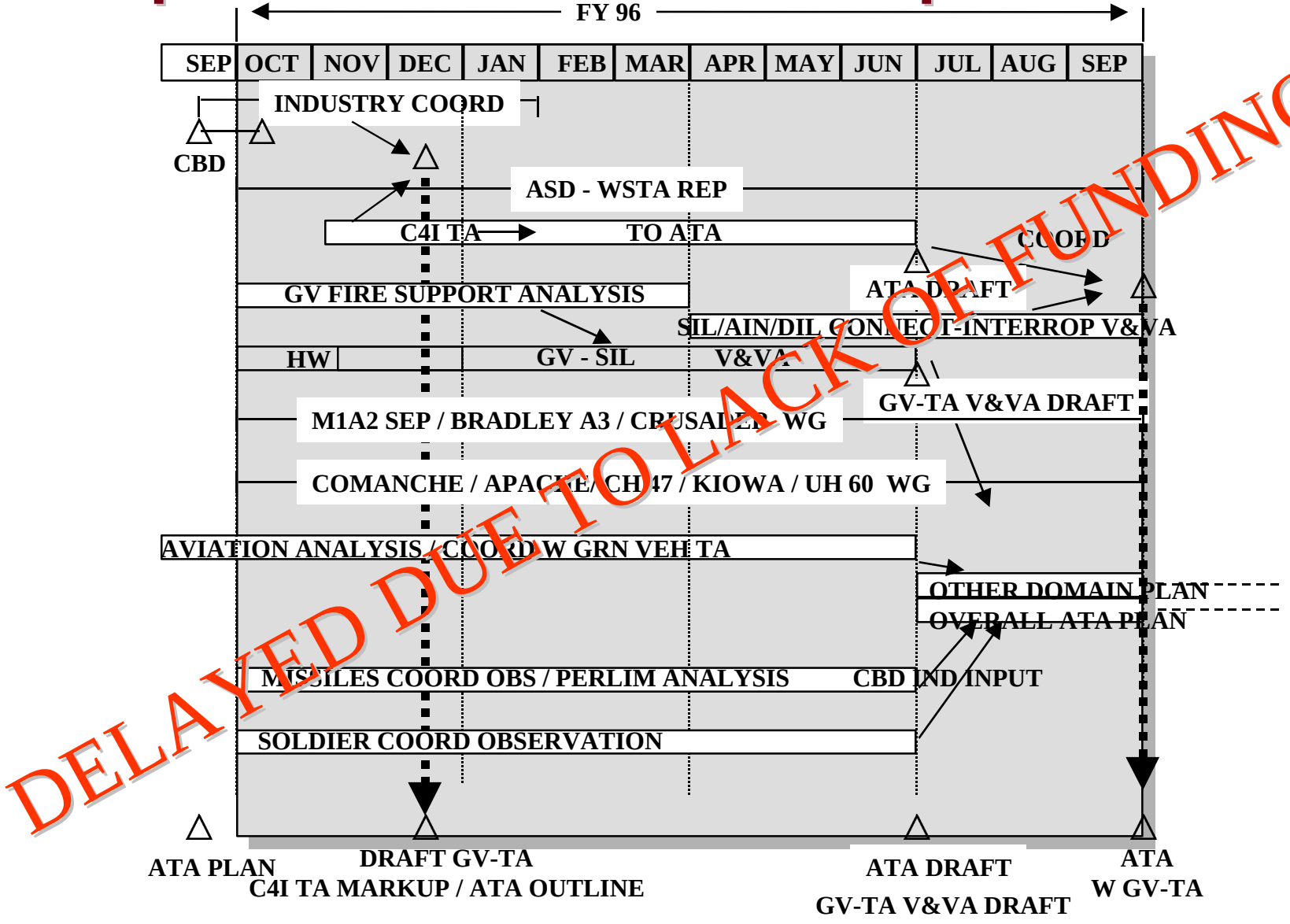
WSTAWG Activities

- 28 Apr 95 — ADO/DISC4 meeting with PEO's and RDEC Tech Directors calling for WSTA.
- 2 May 95 — ADO/DISC4 tasking to AMC.
  - AMC tasking to TACOM. POC: Mr. Don Sarna.
- 18 May 95 — First WSTAWG meeting.
- 26 May 95 — Phase I Report.
  - Sent through AMC to ADO & DISC4.
  - Scope, Technical Approach, Responsibilities.
- 7 Jun 95 — Advanced Program Briefing to Industry.
- 13 Jun 95 — Second WSTAWG Meeting.
- 28 Jun 95 — Phase II WSTAWG Report.
  - Course of action, Schedule, and Cost.
- 27 Jun 95 — Council of Colonels meeting.
  - ADO, DISC4, AMC, TARDEC.

WSTAWG Activities (cont..)

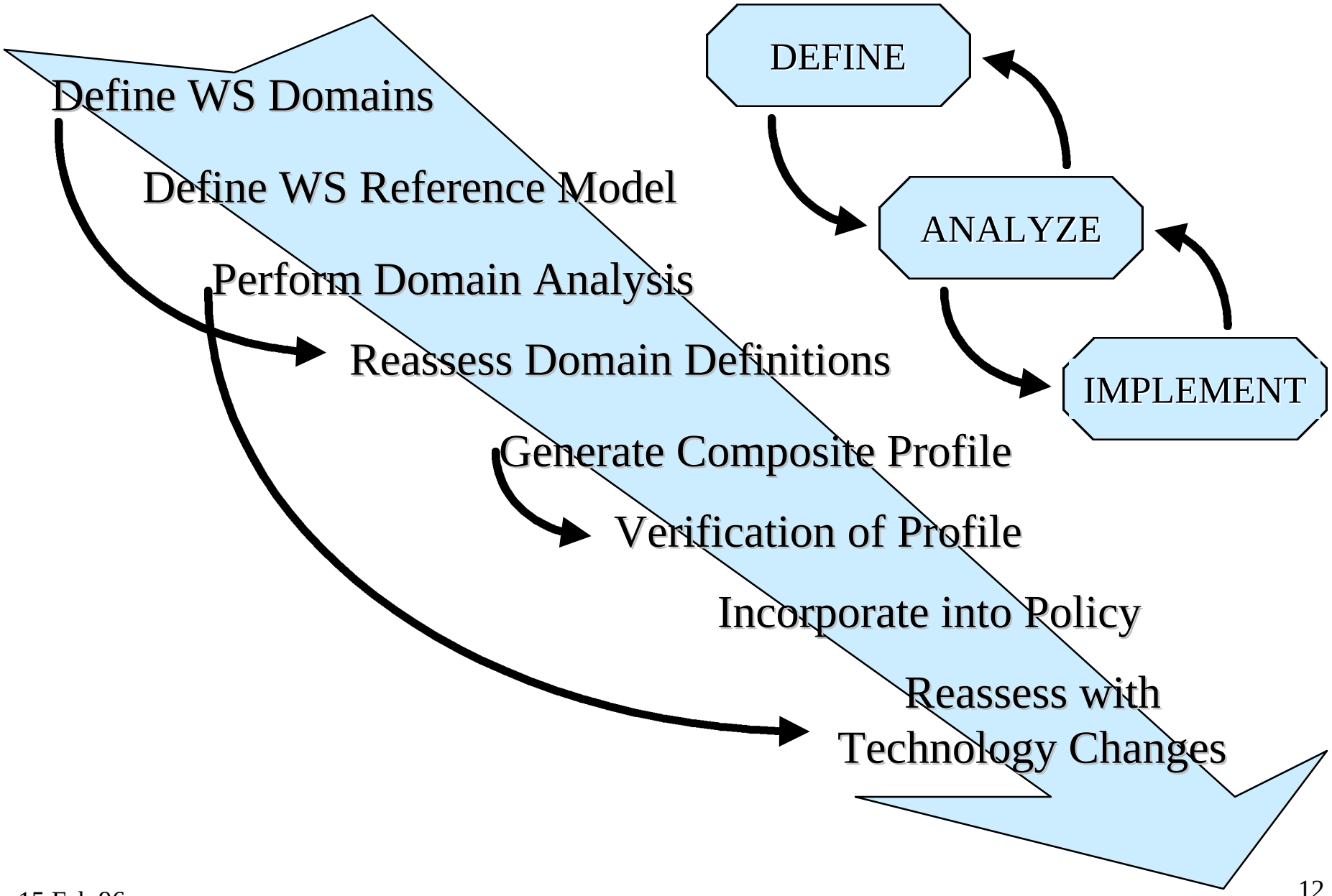
- 28 Jul 95 — Army Science Board Briefing.
- 15 Sep 95 — Memorandum to ADO (MG Rigby) from WSTAWG Chair (Mr. Sarna) requesting funding.
- 28 Sep 95 — Third WSTAWG Meeting.
- 26 Oct 95 — Meeting with ATA Chapter Authors.
  - Attended and submitted comments.
- 05 Dec 95 — User Workshop #1.
  - Attended and submitted comments.
- 04 Jan 96 — User Workshop #2.
  - Attended and submitted comments.
- 11 Jan 96 — Council of Colonels for ATA.
- 17 Jan 96 — General Officer Steering Committee.

Proposed WSTAWG Development Plan



- WSTAWG Phase II Report, Mr. Donald Sarna, 31 Aug 95

WSTAWG Systems Engineering Process



Domain Analysis Process

- Identify Platforms and group.
- Identify major platform group functionality.
- Identify inter/intra interfaces for each group.
  - Apply data modeling techniques.
- Perform engineering analysis of each platform.
  - Standards currently in use, planned to be used.
  - Evaluate operational and technical requirements.
  - Government/Industry/Academic Working Groups.

Domain Analysis Process (cont.)

- Generate Domain Standards Profile.
  - Coordination with other domains.
  - Extensions, expansions, exceptions to higher level domain standards.
- Verification and Validation of Domain Profile.
- Reassess individual platform membership within a domain.
- Consolidate Domain Standards
  - Common standards.
  - Alternate approach standards.

Ground Vehicle Sub-Domain

- Team Involved
  - TARDEC (lead) Mr. Steven Grevemeyer
  - ARDEC Mr. Wayne Sherer
  - ERDEC Mr. William Ginley
- Accomplishments
  - Industry Day held at TACOM, 7 Dec 95.
  - Vetronics Open Systems Architecture (VOSA) Guidelines.
    - Vetronics Real-Time Operating Services (VRTOS) API.
    - Vetronics Graphical User Interface (VGUI) API.
  - Project AH18, Armament research has ATA focus.
  - Paladin and Mortar Systems converted to ATA implementation efforts.
  - PEO-ASM active in ATA activities.

Aviation Sub-Domain

- Team Involved
  - AVRDEC (lead) Mr. Clemence Mudd
  - PM AEC Mr. Eric Samuda
  - PEO Aviation Electronic Center
- Accomplishments
  - Aviation System of Systems Architecture (ASOSA).
  - CH-47 Intra-platform Architecture Study (system taxonomy).
    - Contract to Maner Systems.
    - Contract to Battelle Memorial Institute.
  - Task Force XXI compliance.
  - SAE Generic Open Architecture Committee involvement.

Missile Sub-Domain

- Team Involved
  - MRDEC, Huntsville, AL (lead) — Mr. Rod Summers
  - PEO Missile Defense — COL Philip White
  - PEO Tactical Missile — COL Dan Prescott
- Accomplishments
  - Creation of a generic missile architecture and support tools.
    - ARPA Domain Specific Software Architecture
    - ARPA Evolvable Designs for Complex Software
  - Creation of the Real-Time Executive for Missile Systems (RTEMS) and RTEMS API.
  - Rapid Force Projection Initiative (RFPI) Testbed.

Soldier Sub-Domain

- Team Involved
  - NATICK (lead) Mr. John Monroe
  - PM Soldier MAJ Mark Collins
- Accomplishments
  - Land Warrior contract has an ATA focus.
  - Domain analysis ongoing.

WSTAWG Comments on ATA Version 4.0

- The WSTAWG was successful in creating a domain-based HCI concept.
  - Top-level style guides replace by more specific domain-specific style guides.
  - Tight coupling of look and feel between systems in the same domain.
- Contracting.
  - “ATA standards as contractual requirements conflict with ‘performance-based’ contracting”.
  - ATA references standards and specifications that conflict with streamlined acquisition.
    - Standards can not reference other standards.
  - ATA standards scheduled to be updated every six months.

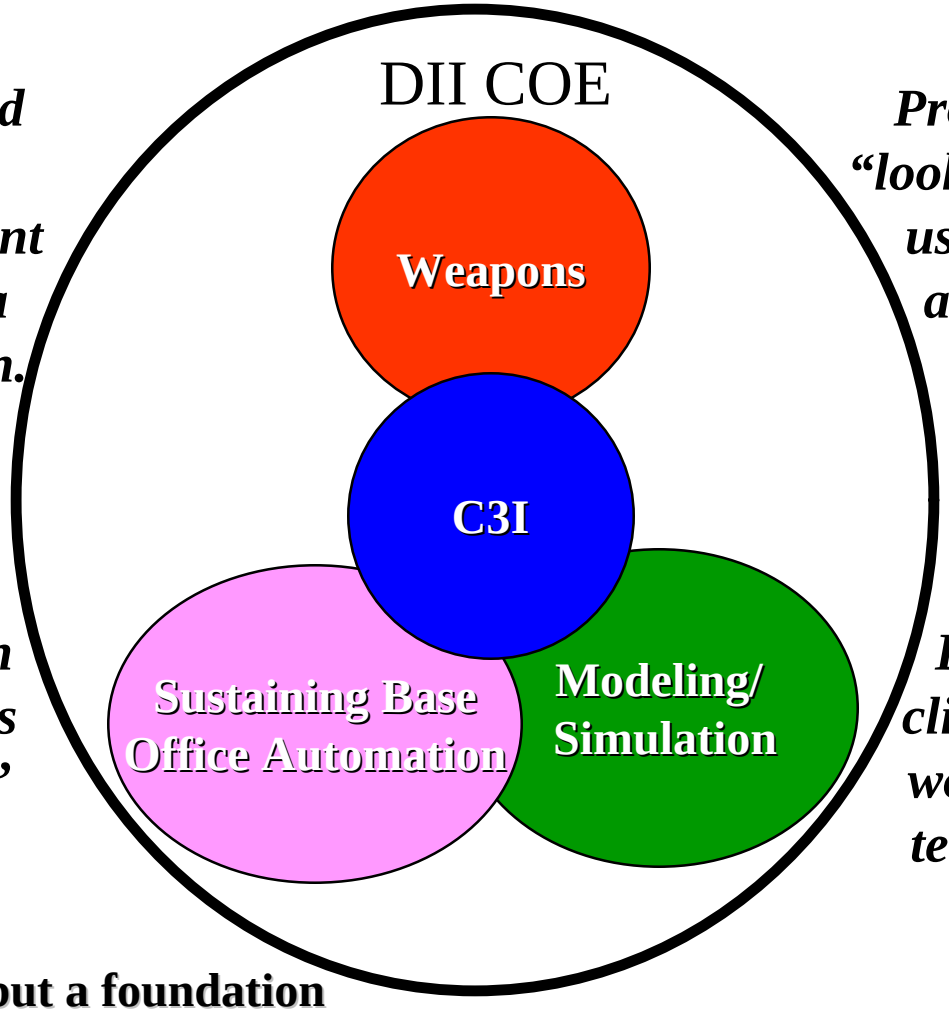
WSTAWG Comments on ATA Version 4.0 (cont.)

- WSTAWG supports the COE "concept".
  - There is only one DII COE concept, process, and approach.
  - The ATA envisions the tailoring of software components and infrastructure within a hierarchy of implementations of the COE.
    - ATA Version 4.0 Section 1.2.1.
  - Common reusable software and products are inherited downward and either used as is, or replaced or augmented with more specialized software modules.
  - Reuse of Application software within the Weapons Domain is supported.

DII COE CONCEPT

Provides rules and guidance for integrating different applications on a single workstation.

Provides common "look and feel" to end users and system administrators.



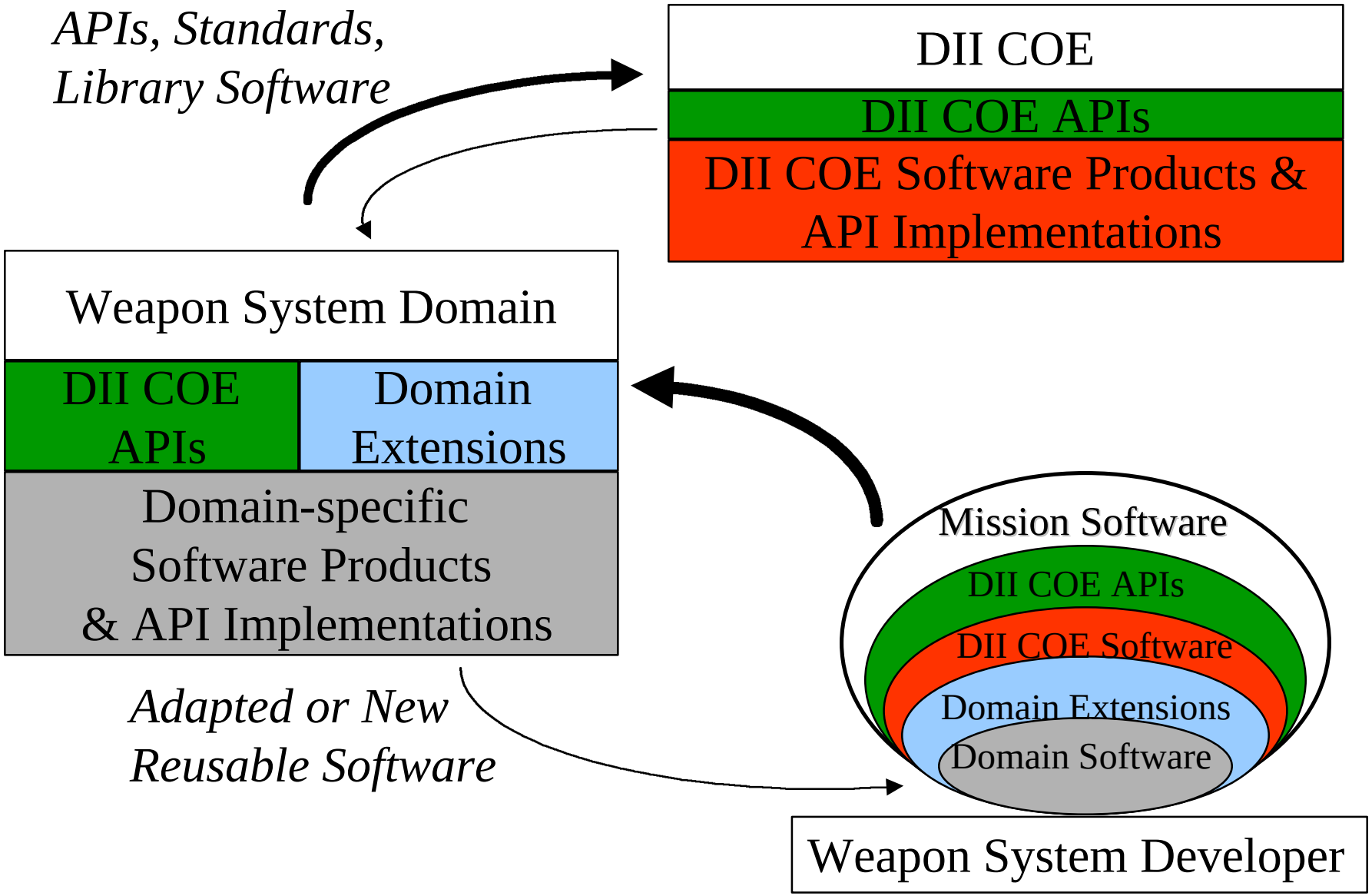
Treats Mission Applications as "shrink-wrap" products.

Based on client/server workstation technology.

"COE is not a system but a foundation for building an open system…"

- DII COE I&RTS: Rev 2.0 10/23/95

Software Reuse Process



Summary

- The WSTAWG has been instrumental in representing the needs of the varied weapon systems community within the Army.
  - Significant influence in support of ATA Version 4.0
  - Weapon System Domain creation and coordination.
  - Individual sub-domain analysis and activities.
- Individual WSTAWG sub-domains have ongoing technical architecture-related development efforts underway.
- Contact us at: wstawg@vtc.tacom.army.mil

Path Forward

- WSTAWG Meeting 27-28 Feb 96, Huntsville, AL.
- Evaluation of the DII COE APIs and software as it becomes available.
- Completion of individual domain analyses.
- Submit candidate Weapon Systems APIs to COE library.
- Support Joint Technical Architecture.
- Web page enhancement and maintenance.
  - http://www.tacom.army.mil/wstawg/wstawg.html

Background Issues

Funding Issues

- 15 Sep 95 Memo to ADO (MG Rigby) from AMC (BG Beauchamp).
  - Subject: Revised development approach for ATA.
- 05 Oct 95 Memo to AMC (BG Beauchamp) from ADO (MG Rigby).
  - Subject: Revised development approach for ATA.
- 30 Nov 95 DISC4 Unfunded Requirement Form.
  - Subject: Weapon System Technical Architecture Development
  - Total Funding: 4.525M
  - Available: 2.825M
  - Unfunded: 1.700M
- 13 Dec 95 Memo to ADO from AMC.
  - Subject: FY96 Funding requirement for WSTAWG.
- 06 Feb 96 WSTAWG funding requirement lumped with ASEO.
  - 98-03 POM PE0604805.

Weapon System Interoperability

- "The only practical way to achieve interoperability is to use exactly the same software, written to appropriate standards, for common functions across applications."
- DII COE I&RTS Rev 2.0, page 1-12.
- Interoperability requirements are derived from USER REQUIREMENTS.
- The cornerstones of interoperability are STANDARDS and TESTING.
  - Testing removes interpretation from standards documents.
- Weapon systems must interface with C3I systems at defined interoperability points:
  - The interface is owned by the C3I domain.
  - The implementation of the interface is owned by the weapon system domain.

Weapon System COE Requirements